Catalogue no. 11-626-X — No. 003
ISSN 1927-503X
ISBN 978-1-100-19826-2

Analytical Paper

Economic Insights

Do Relative Canada/U.S. Prices Equate to the Exchange Rate?

by Ryan Macdonald
Economic Analysis Division

Statistics Canada Statistique Canada

Canada

How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website at www.statcan.gc.ca, e-mail us at infostats@statcan.gc.ca, or telephone us, Monday to Friday from 8:30 a.m. to 4:30 p.m., at the following numbers:

Statistics Canada's National Contact Centre

Toll-free telephone (Canada and United States):

Inquiries line	1-800-263-1136
National telecommunications device for the hearing impaired	1-800-363-7629
Fax line	1-877-287-4369

Local or international calls:

Inquiries line	1-613-951-8116
Fax line	1-613-951-0581

Depository Services Program

Inquiries line	1-800-635-7943
Fax line	1-800-565-7757

To access this product

This product, Catalogue no. 11-626-X, is available free in electronic format. To obtain a single issue, visit our website at www.statcan.gc.ca and browse by "Key resource" > "Publications."

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca under "About us" > "The agency" > "Providing services to Canadians."

Published by authority of the Minister responsible for Statistics Canada

© Minister of Industry, 2012

All rights reserved. The content of this electronic publication may be reproduced, in whole or in part, and by any means, without further permission from Statistics Canada, subject to the following conditions: that it be done solely for the purposes of private study, research, criticism, review or newspaper summary, and/or for non-commercial purposes; and that Statistics Canada be fully acknowledged as follows: Source (or "Adapted from", if appropriate): Statistics Canada, year of publication, name of product, catalogue number, volume and issue numbers, reference period and page(s). Otherwise, no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form, by any means—electronic, mechanical or photocopy—or for any purposes without prior written permission of Licensing Services, Information Management Division, Statistics Canada, Ottawa, Ontario, Canada K1A 0T6.

Cette publication est aussi disponible en français.

Standard symbols

The following symbols are used in Statistics Canada publications:

.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0^s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p}	preliminary
^{r}	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E}	use with caution
F	too unreliable to be published
*	significantly different from reference category ($p < 0.05$)

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Do Relative Canada/U.S. Prices Equate to the Exchange Rate?

By Ryan Macdonald

This *Economic Insights* article discusses price differences between Canada and the United States. It is based on the concepts and methods from Statistics Canada's Purchasing Power Parity program.

Canada and the United States share one of the longest borders in the world, their economies are intertwined, and trade between them is extensive. Consequently, a widely held public expectation is that, after adjusting for the exchange rate, the prices of goods between the two countries should roughly equate.

The 'law of one price'

The postulate that prices for goods adjust between nations to reflect the exchange rate is the 'law of one price.' It states that consumers and businesses will move to arbitrage between markets so that the price of a good in Canada is equal to the price of that good in the United States multiplied by the exchange rate. However, the law of one price is seldom supported in practice, and may not apply when transportation costs are high relative to the value of the good or service, trade barriers exist, market participants have some form of market power, or for non-traded goods and services.

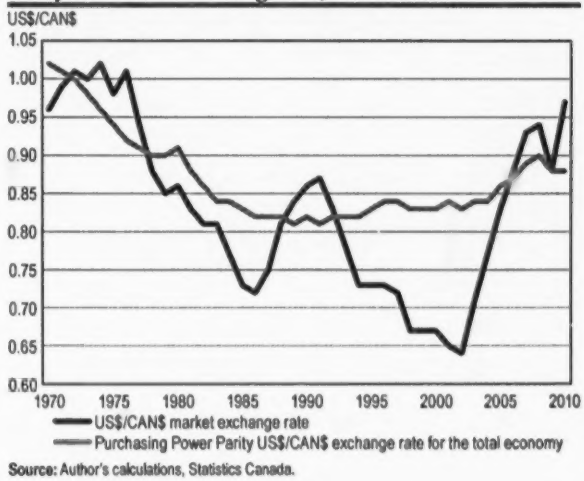
Moreover, the law of one price applies only to a single commodity. Consumers in Canada and the United States purchase thousands of goods and services, some of which are traded, some of which are not. To obtain a more appropriate measure for comparing U.S. and Canadian prices, it is necessary to combine information representative of all goods and services that consumers buy. This aggregate measure, referred to as a "Purchasing Power Parity," reflects differences in the overall price level between the United States and Canada.

Market exchange rates versus purchasing power parities

The U.S.–Canadian Purchasing Power Parity is an estimate of what the exchange rate would have to be to equate the purchasing power of the U.S. and Canadian currencies in final product markets. It is a hypothetical exchange rate based on observed prices. It can, and does, differ from the actual market exchange rate because the products Americans and Canadians consume are not the same as the products and commodities traded, and because the Purchasing Power Parity excludes financial asset prices that can influence market exchange rates.

The U.S.–Canadian Purchasing Power Parity exchange rate and the US$/CAN$ market exchange rate occasionally have similar levels, and can move in the same directions through time (Chart 1). Since 1970, they have been broadly equal in six periods: 1971/1972, 1977/1978, 1988/1989, 1992/1993, 2005/2006, and 2008/2009. In the remaining periods, however, the rates differed, sometimes substantially. Nonetheless, over time, they have been similar enough that the market exchange rate can be viewed as fluctuating around the Purchasing Power Parity exchange rate.

Chart 1
US$/CAN$ market exchange rate and Purchasing Power Parity US$/CAN$ exchange rate, 1970 to 2010



Source: Author's calculations, Statistics Canada.

In the early 1970s, the market exchange rate was as much as 10 cents higher than the Purchasing Power Parity exchange rate. A subsequent reversal of positions brought the market exchange rate below the Purchasing Power Parity exchange rate—as much as 10 cents lower in 1985/1986. By 1991, the market exchange rate had risen to 6 cents more than the Purchasing Power Parity

exchange rate, but then fell to create a 19-cent gap between the two in 2000/2001. The rapid appreciation of the Canadian dollar after 2002 eliminated the disparity by 2005/2006, and then pushed the market exchange rate 8 cents above the Purchasing Power Parity exchange rate in 2010.

A common source of changes?

While deviations between the market exchange rate and the Purchasing Power Parity exchange rate can last for several years, the fact that they repeatedly revert to similar levels suggests that they are both influenced by the same fundamental features of the U.S. and Canadian economic systems. It is beyond the scope of this paper to delve into what features are most important for determining the relative price level for the United States and Canada; however, economic theory suggests that product and industry mixes, trade patterns, productivity levels, and money supply are all possibilities.

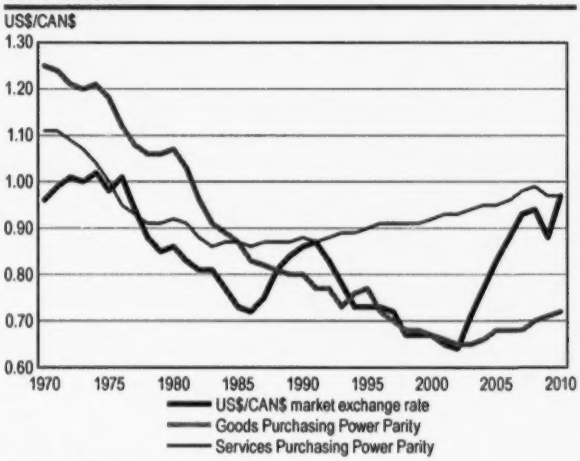
The volatility of the market exchange rate compared with the Purchasing Power Parity exchange rate is noteworthy. In the context of both rates being driven by the same economic forces, it is natural to ask if the market exchange rate adjusts more rapidly, and to a greater degree. Since 1970, Canada has maintained a floating exchange rate based on a fiat currency. This floating exchange rate adjusts as economic shocks from abroad are transmitted to Canada. The relative volatility of the market exchange rate and the relative stability of the Purchasing Power Parity exchange rate suggest that the floating exchange rate has helped to absorb short-run shocks that would otherwise manifest themselves in final product prices.

Consumer goods, consumer services and the exchange rate

Purchasing Power Parity exchange rates are also produced at more disaggregated levels to facilitate comparisons of real expenditures on product groups between the United States and Canada. These disaggregated Purchasing Power Parity exchange rates can be used to reinforce two points.

First, the Purchasing Power Parity exchange rates for goods do not move in the same way as for services over time (Chart 2). The extent to which the market exchange rate deviates from the Purchasing Power Parity exchange rate depends greatly on whether goods or services are examined. This result reflects differences in the ability of firms and consumers to arbitrage between markets. It also reinforces the necessity of using an overall measure of relative prices between the United States and Canada when assessing the degree to which the market exchange rate is over- or undervalued. Estimates based on particular products or product groups will not capture the nature of all expenditures between the two countries, and will not be able to adequately describe differences in their aggregate price levels.

Chart 2
US$/CAN$ market exchange rate and Purchasing Power Parity US$/CAN$ exchange rate for goods and services, 1970 to 2010



Source: Author's calculations, Statistics Canada.

Second, when the Purchasing Power Parity exchange rates for consumer goods and consumer services (as opposed to the overall Purchasing Power Parity exchange rate) are compared with the market exchange rate, the latter is still more volatile. The difference in volatility between the overall Purchasing Power Parity and the market exchange rate, therefore, does not appear to stem from rigidity in non-traded services prices.

Do U.S. and Canadian prices equate?

The Purchasing Power Parity exchange rate is an estimate of the exchange rate necessary to equate purchasing power between the United States and Canada for an overall bundle of final products. Since 1970, movements in the market exchange rate and the Purchasing Power Parity exchange rate have been similar. At particular points in time, the two rates will be broadly equal, but these episodes are fleeting. In the short-term, market exchange rates and Purchasing Power Parity exchange rates can diverge considerably. The short-run responses of the market exchange rate place it in a position where it rarely conforms to the notion of equating the purchasing power of the two nations. Moreover, because the Purchasing Power Parity exchange rate is based on a large group of products and services, during periods where the market exchange rate may, on average, equate purchasing power, the prices of the individual products and services or small groups of products and services need not equate.

References

This *Economic Insights* article is based on Economic Analysis Division research into U.S.–Canadian price differences. For more information, see:

Baldwin, J.R., and R. Macdonald. 2009. *PPPs: Purchasing Power or Producing Power Parities?* Statistics Canada Catalogue no. 11F0027M. Ottawa, Ontario. Economic Analysis Research Paper Series. No. 058.

Baldwin, J. R., W. Gu and B. Yan. 2008. *Relative Multifactor Productivity Levels in Canada and the United States: A Sectoral Analysis.* Statistics Canada Catalogue no. 15-206-X. Ottawa, Ontario. The Canadian Productivity Review. No. 19.

Baldwin, J.R., and B. Yan. 2006. *Domestic and Foreign Influences on Canadian Prices over Exchange Rate Cycles, 1974 to 1996.* Statistics Canada Catalogue no. 11F0027M. Ottawa, Ontario. Economic Analysis Research Paper Series. No. 43.